AGU FALL MEETING

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H33M-06: Very High Resolution Tree Cover Mapping for Continental United States using Deep Convolutional Neural Networks

Wednesday, 13 December 2017
14:55 - 15:10
New Orleans Ernest N. Morial Convention Center - 291-292

Uncertainties in input land cover estimates contribute to a significant bias in modeled above gound biomass (AGB) and carbon estimates from satellite-derived data. The resolution of most currently used passive remote sensing products is not sufficient to capture tree canopy cover of less than ca. 10-20 percent, limiting their utility to estimate canopy cover and AGB for trees outside of forest land. In our study, we created a first of its kind Continental United States (CONUS) tree cover map at a spatial resolution of 1-m for the 2010-2012 epoch using the USDA NAIP imagery to address the present uncertainties in AGB estimates. The process involves different tasks including data acquisition/ingestion to pre-processing and running a state-of-art encoder-decoder based deep convolutional neural network (CNN) algorithm for automatically generating a tree/non-tree map for almost a quarter million scenes. The entire processing chain including generation of the largest open source existing aerial/satellite image training database was performed at the NEX supercomputing and storage facility. We believe the resulting forest cover product will substantially contribute to filling the gaps in ongoing carbon and ecological monitoring research and help quantifying the errors and uncertainties in derived products.

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